

to have many points of resemblance. In shape as well as in sculpture it is very like; only both ribs and spirals are much stronger; the mouth, too, is oval, but it is pointed above and is longer below, *N. ephamilla* having a broader and more truncate base. My estimate on all these points, however, is based on Philippi's description and figure, the species itself being unknown to me.

MOLLUSCA OF H.M.S. 'CHALLENGER' EXPEDITION.—Part XIV.

By the Rev. ROBERT BOOG WATSON, B.A., F.R.S.E., F.L.S.

[Published by permission of the Lords Commissioners of the Treasury.]

[Read March 16, 1882.]

Fam. MURICIDÆ, *Flem.*

Gen. FUSUS, *Lam.*

Gen. TROPHON, *de Montf.*

In the following group are several interesting forms, especially some of the *Siphos* and *Trophons*; but of them all, probably the most remarkable is one which, for the present, I have called *Fusus (Colus) pagodoïdes*. I have no doubt that in the long run it, with the two species of *Fusus* which here precede it, and many of the *Trophons* will be classed with the *Fusus pagoda*, Less., and the *Pleurotoma spinicincta*, v. Mart., for which last Prof. v. Martens has lately proposed a subgenus (*Columbarium*), based chiefly on the radula. Of this organ Mr. G. Schacko describes and figures two very curious teeth, which were the only ones he was able to obtain from the dried-up specimen in his hands. If I have not adopted Prof. v. Martens's classification here, it is because his paper reached me only a very few days ago, and time has not sufficed to consider the matter in all its bearings.

Gen. FUSUS, *Lam.*

Subgen. METULA, *H. & A. Ad.*
SIPHO (*Klein*), *Mörch.*

Subgen. NEPTUNA, *Bolten.*
COLUS, *Gray.*

1. *Fusus (Metula) philippinarum*,
n. sp.
2. *F. (Sipho) —*, n. sp.
3. *F. (S.) pyrrostoma*, n. sp.
4. *F. (S.) calathiscus*, n. sp.
5. *F. (S.) setosus*, n. sp.
6. *F. (S.) scalaris*, n. sp.
7. *F. (S.) regulus*, n. sp.

- Fusu (Sipho) edwardienseis*,
n. sp.
9. *F. (Neptunea) Dalli*, n. sp.
10. *F. (N.) futile*, n. sp.
11. *F. (Colus) radialis*, n. sp.
12. *F. (C.) sarissophorus*, n. sp.
13. *F. (C.) pagodoïdes*, n. sp.

1. *FUSUS* (*METULA*) *PHILIPPINARUM*, n. sp.

St. 210. Jan. 25, 1875. Lat. $9^{\circ} 26'$ N., long. $123^{\circ} 45'$ E. Philippines. 375 fms. Mud. Bottom temperature $54^{\circ} \cdot 1$ F.

Shell.—Strong, porcellaneous, pale ruddy brown, fusiform, long, subscalar, with feeble ribs and with spiral threads; the whorls are slightly angulated; the mouth long, with a slight emargination above, and an open triangular canal in front. *Sculpture*. Longitudinals—there are on the upper whorls about 15 small, sharpish, straight, bluntly mucronated ribs, which are feeble on the shoulder beneath the suture, but stronger below; on the later whorls these are less distinct and more oblique, becoming flexuous on the base; these correspond exactly with the delicate crimpings of the lines of growth. Spirals—the whole surface is covered with fine, regular, and equal narrow threads and broader furrows; of these, on the penultimate whorl there are about 15, the centre one of which is thrown into prominence by a slight angulation, very marked on the earlier but feeble on the later whorls. *Colour* pale ruddy brown, with a flinty pellucidness, especially toward the apex, and more of whiteness toward the point of the snout. *Spire* high, conical, subscalar. *Apex* contracting abruptly to a small raised point, formed by about three smooth rounded embryonic whorls, which are not sharply distinguished from those which follow, the regular sculpture making its appearance gradually. *Whorls* 8 in all; the upper ones have a sloping shoulder, are angulated in the middle, and are cylindrical or slightly contracted below; the last is more rounded, and is produced into a long and pointed base ending in a triangular conical snout. *Suture* slightly channelled. *Mouth* long and pear-shaped. *Outer lip* thickened internally with a strongish white varix, between which and the sharp patulous edge the spiral threads of the exterior sculpture are just visible; it is very slightly emarginated above near the body, and well arched throughout, till along the canal, where it is straight but oblique. *Inner lip* straight across the body, hollow in the middle, and straight but unusually oblique down the whole pillar, which is not in the least twisted: a thin layer of glaze narrowly spreads along its whole length. *Operculum* thin, subtriangular, pointed behind, and bluntly so in front at the apex, which is subterminal, but slightly coiled in to the inner side. H. 0.9. B. 0.39. Penultimate whorl, height 0.16. Mouth, height 0.52, breadth 0.2.

This specimen is classed as a *Metula* with considerable doubt :

the outer lip is not thickened externally, nor distinctly toothed internally; but these features are perhaps due to the shell not being quite full-grown; the mouth, too, is a little broad for the genus. The operculum of *Metula* is unknown to me; but Adams's figure of the operculum of *Cantharus* is in form very similar (only that in the 'Challenger' species the apex is a little more turned in subspirally), and Troschel confirms Adams's classification here, and puts the two genera in closest collocation. The shell has some faint resemblance to *Pisania reticulata*, A. Ad.

2. *FUSUS* (*SIPHO*) —, n. sp. ?

St. 47. May 7, 1873. Lat. $41^{\circ} 15' N.$, long. $65^{\circ} 45' W.$ Off Halifax. 1340 fms. Mud.

The four specimens of this species are in bad condition, being dead, broken, and not full-grown. It resembles *F. cinereus*, Say (see Binney, Gould's Invert. Mass. p. 370, fig. 637), = *Buccinum plicosum*, Menke (see Philippi, Abbild. &c. I. p. 109, pl. xxvi. fig. 8); but its longitudinal ribs are more numerous, and, instead of being convex to the right as in that species, they are convex to the left. The corresponding whorls here are smaller; and it has no approach to an umbilicus. It has also some resemblance to *B. obsoletum*, Say, = *Nassa noveboracensis*, Wood, Index, p. 214, Suppl. pl. iv. fig. 26, but is very obviously different.

3. *FUSUS* (*SIPHO*) *PYRRHOSTOMA*, n. sp.

St. 141. Dec. 17, 1873. Lat. $34^{\circ} 41' S.$, long. $18^{\circ} 36' E.$ 20 miles S.S.E. of Cape of Good Hope. 98 fms. Sand and mud. Bottom temperature $49^{\circ} 5 F.$

Shell.—Fusiform, with a shortish base, a high spire, and a bent mamillary apex; ribbed, and with rather fine spiral threads; light brown and thin. *Sculpture*. Longitudinals—each whorl is crossed by about 15 concave, sinuous, narrow, and little-raised ribs, which on the last whorl die out on the base. The fine hair-like lines of growth correspond with the curves of the ribs. Spirals—below the suture there is a slightly constricted area, as in the Pleurotomidæ; below this is a very blunt indistinct carination. The whole surface is covered with slight rounded spiral threads, which are markedly stronger and wider parted on the base and snout. *Colour* a ruddy brownish yellow, with a very thin, hard, smooth, persistent epidermis. *Spire* high, conical. *Apex* bent, cylindrical, the first and second whorls being nearly of a size, and both rather swoln. *Whorls* 7, convex, slightly constricted

above, very faintly and obtusely angulated above the middle, and contracted below; the last is slightly ventricose, with a rounded base, produced into a very lop-sided triangular snout. *Suture* small but distinct, being slightly impressed. *Mouth* crescentic, pointed above, and prolonged below into a short oblique canal. *Outer lip* thin and sharp, slightly sinuated above, rounded and prominent in the middle, and retreating along the canal. *Inner lip* flat above, concave at the base of the pillar, which is straight, longish, conical, and obliquely cut off in front: a thinnish, narrow, sharply-defined pad of glaze extends along the whole length of the lip. *Operculum* subtriangular, with the apex at the lower inner point, thin but strong, brownish yellow. H. 1.55. B. 0.6. Penultimate whorl, height 0.28. Mouth, height 0.78 breadth 0.33.

This species greatly resembles *Fusus* (*Sipho*) *Kröyeri*, Möller; but is smaller, and has a contraction below the suture absent in that, the whorls are less tumid, the longitudinal ribs are much smaller and less curved; the lines of growth correspond with the ribs instead of cutting obliquely across them; the spiral sculpture, too, is more raised and less regular. The apex in the 'Challenger' specimen is somewhat eroded, but is distinctly more cylindrical, the first and second whorls being much more nearly equal than in Möller's species.

4. *FUSUS* (*SIPHO*) *CALATHISCUS*, n. sp.

St. 147. Dec. 30, 1873. Lat. 46° 16' S., long. 48° 27' E. Off Marion Island and the Crozets. 1600 fms. *Globigerina*-ooze. Bottom temperature 32°·2 F.

Shell.—Thin, white, tumid, fusiform, with a high scalar spire, and a rounded base prolonged into a short, small-pointed, lop-sided snout. *Sculpture*. Longitudinals—there are very many close-set lines of growth; the surface of the thin membranaceous epidermis is very finely and sharply wrinkled, so as to project in very fine lamellæ. Spirals—there are on the upper whorls 7 to 8 narrow, rounded threads, parted by wider furrows which are very shallow. The spirals become feebler and sparser on the last whorl, with fainter threads in the intervals. *Colour* porcellaneous white under the pale yellowish-white epidermis. *Spire* high, blunt, scalar. *Apex* eroded. *Whorls* about 6, well rounded, slightly flattened at the top, and a little contracted toward the bottom; the last is rather tumid. *Suture* strong and impressed.

Mouth oval, rounded above, pointed at the canal, which is very short, wide, and a little oblique. *Outer lip* thin, well rounded, patulous and straight along the canal. *Inner lip* concave from the top of the mouth to the point of the pillar, which is straight, short, rather narrow, and obliquely cut off in front. A very thin glaze runs across the body and down the pillar. *Operculum* thin, pale yellow, with very regular curves of growth arching from side to side; in form it resembles a long narrow wedge with a terminal apex. H. 1.25. B. 0.7. Penultimate whorl, height 0.3. Mouth height 0.77, breadth 0.4.

This species strongly resembles *Buccinopsis canaliculata*, Dall, of which he kindly sent me a specimen from Behring's Straits. It has, in particular, the deeply impressed or canaliculated suture of that form; but it is much thinner, has higher and more tumid whorls, with much finer sculpture, and it has not the lanuginous epidermis of that species.

5. FUSUS (SIPHO) SETOSUS, n. sp.

St. 146. Dec. 29, 1873. Lat. 46° 46' S., long. 45° 31' E. Off Marion Island. 1375 fms. *Globigerina*-ooze. Bottom temperature 35° 6.

St. 147. Dec. 30, 1873. Lat. 46° 16' S., long. 48° 27' E. Off Marion Island and the Crozets. 1600 fms. *Globigerina*-ooze. Bottom temperature 34° 2.

Shell.—Thin, white, setose, with longitudinal and spiral threads, fusiform, with a scalar spire, and a rounded base produced into a short, prominent, lop-sided snout. *Sculpture*. Longitudinals—there are on the upper whorls many, very regular, rounded threads, which become fainter on the later whorls; besides these, the epidermis is closely wrinkled in minute sharp lamellæ. Spirals—there are on the upper whorls 5 to 6 rounded threads parted by wider interstices; these are of about the same strength as the longitudinals; and their intersection forms a very regular lattice-work, with a short stiff bristle at their crossing-points; on the last whorl these bristles are crowded close together so as to be contiguous. *Colour* porcellaneous white under the greyish-yellow epidermis. *Spire* high, blunt, scalar. *Apex* eroded. *Whorls* about 6, well rounded, slightly flattened at the top, and constricted below; the last is rather tumid. *Suture* strong and impressed. *Mouth* rounded above, with a slight angle at the top, and a short open canal below that runs out obliquely across the point of the pillar. *Outer lip*

thin, well rounded, straight and patulous along the canal. *Inner lip* concave, with a very short direct pillar, which is obliquely cut off and twisted in front; a very thin narrow glaze lies on body and pillar. H. 1.1. B. 0.6. Penultimate whorl, height 0.22. Mouth, height 0.44, breadth 0.33.

It is very possible this and the preceding may be the same species, and may be ultimately united to *Buccinopsis canaliculata*, Dall; but the differences in form and in epidermis make their separation inevitable till a fuller series of specimens perhaps supply links of connection.

6. *Fusus* (SIPHO) *SCALARIS*, n. sp.

St. 305 A. Jan. 1, 1876. Lat. 47° 48' 30" S., long. 70° 47' W. N.W. Patagonia. 125 fms. Mud.

Shell.—Small, thin, porcellaneous white, with feeble longitudinal and faint spirals, a high, conical, scalar spire, small mamillary apex, a short, rounded, contracted base, and a small, lop-sided, slightly reverted, emarginate snout. *Sculpture*. Longitudinals—there are about 15 rounded, slightly tumid ribs, which originate below the upper suture, and hardly reach the lower, and on the base die out; they are parted by broad, rounded, shallow furrows; the surface is all scored with sharp unequal lines of growth. Spirals—near the top of the whorls is a blunt angulation; above this obsoletely, and below it not very strongly, the surface is scored by broad, flatly rounded threads parted by narrow, very slightly depressed furrows; these threads and furrows do not appear on the snout. *Colour* porcellaneous white. *Spire* high, conical and scalar. *Apex* small, mamillate, with a very small, slightly depressed tip; it consists of about two smooth, rounded embryonic whorls. *Whorls* 7, with a high, slightly declining, and rounded shoulder, defined by a blunt angulation, below which the whorls are somewhat cylindrically conical, contracting slightly into the lower whorl. *Suture* impressed, but rounded and open, the lower whorl lapping up on the upper, and the true suture being linear. *Mouth* oval, bluntly pointed above, and produced below into the short, open, oblique canal. *Outer lip* a little receding above on the shoulder, bluntly angulated at the keel, below which point it is arched, with a very slight constriction at the short, open, and slightly reverted snout. *Inner lip* very slightly concave above, straight on the short pillar, and oblique along the canal, where there is a twist on the point of the pillar; it is bordered by a narrow thin glaze, which runs out almost to the extreme point of

the shell. H. 0·5. B. 0·22. Penultimate whorl, height 0·1. Mouth, height 0·23, breadth 0·12.

The generic place of this and the three following species is very doubtful; but the mouth is rather too wide to justify their being classed with the *Pyrene* group of *Columbella*, which the general aspect of the shell suggests as their place.

7. *FUSUS* (SIPHO) *REGULUS*, n. sp.

St. 149 D. Jan. 20, 1874. Lat. 49° 28' S., long. 70° 13' E. Royal Sound, Kerguelen. 28 fms. Mud.

Shell.—Small, thin, porcellaneous white, with fine riblets and delicate spirals, a rather high, subscalar spire, a large blunt mamillary apex, deep suture, small body, a short rounded contracted base, and a small, lop-sided, emarginate snout. *Sculpture*. Longitudinals—there are on the last whorl about 25 narrow, sharply raised, flexuous, little ribs, parted by flat furrows of twice their breadth; these decrease in number up the spire; they die out toward the point of the base; they bend quickly to the left below the suture, advancing to the right lower down: the furrows and snout are scored with fine lines of growth. Spirals—there are feeble, rounded, sparsely-set threads, of which about eight on the penultimate whorl; immediately below the suture they are very faint, but are present. *Colour* yellowish porcellaneous white. *Spire* high, rather cylindrically conical. *Apex* blunt, mamillary, with an exceedingly small impressed tip; it consists of two globose, smooth, embryonic whorls. *Whorls* 5½ to 6 in all, with a rounded shoulder defined by a very slight angulation, below which the whorls are subcylindrical; the last is scarcely tumid, with a rounded contracted base prolonged into a stumpy, slightly reverted, emarginate snout. *Suture* sharp, impressed, rather deep, horizontal. *Mouth* oval, slightly angulated above, and produced below into a short, broad, open, and somewhat oblique canal. *Outer lip* thin, a little expanded, arched, advancing below, contracted at the canal; there is at the top a faint approach to a sinus. *Inner lip* concave above, straight on the pillar, which is in front little oblique, but has a slight twist; a thin narrow glaze defines it throughout. H. 0·28. B. 0·13. Penultimate whorl, height 0·08. Mouth, height 0·14, breadth 0·09.

This species has some faint resemblance to *Columbella* (*Pyrene*) *costulata*, Cantr., but is less compact, has a more impressed suture and more rounded whorls, wants the densely set minute spirals, and has a longer snout; the apex, too, differs from that species,

in which the tip rises in a minute point, while here it is impressed.

8. *FUSUS* (*SIPHO*) *EDWARDIENSIS*, n. sp.

St. 145. Dec. 27, 1873. Lat. $46^{\circ} 43'$ S., long. $38^{\circ} 4' 30'$ E. Between Marion Island and Prince Edward Island. 140 fms. Grey sand.

Shell.—Small, thin, porcellaneous white, feebly ribbed and faintly spiralled, with high spire, blunt apex, rounded whorls, a short contracted base, and a small snout. *Sculpture*. There are on the penultimate whorl over 20 rounded, oblique, and rather straight riblets, parted by similar, rounded furrows; these are obsolete on the last whorl, and are much fewer in number higher up the spire: the lines of growth are very fine. Spirals—the surface is covered with very faint, rounded, close-set threads. *Colour* porcellaneous white with a dead surface. *Spire* high, conical, subscalar. *Apex* blunt, rounded, mamillary, with an immersed tip; it consists of two smooth, globose, embryonic whorls. *Whorls* $5\frac{1}{2}$; they are suddenly contracted above into the suture, below this they are convexly cylindrical, with a very slight contraction at the bottom; the last is a very little tumid, with a rounded conical base produced into a very short, lop-sided, emarginate snout. *Suture* rather deep and sharp. *Mouth* oval, hardly angulated above, and produced below into the short, oblique, open canal. *Outer lip* well arched; there is a feeble sinus near the suture, and a slight prominence in front. *Inner lip* concave above, straight on the pillar, the point of which is twisted and obliquely truncate; it is defined by a thin narrow glaze. H. 0·25. B. 0·11. Penultimate whorl, height 0·06. Mouth, height 0·12. breadth 0·05.

The half-grown shells of *Columbella* (*P.*) *Holbölli*, Möller, which often present feeble riblets, have some faint resemblance to this species, but these have a much sharper apex and a less impressed suture.

9. *FUSUS* (*NEPTUNEA*) *DALLI*, n. sp.

St. 173. July 24, 1874. Lat. $19^{\circ} 9'$ S., long. $179^{\circ} 41'$ E. Off Matuka, Fiji. 315 fms. Coral.

Shell.—Thin, porcellaneous, pale ruddyish yellow, fusiform, long, finely ribbed and spiralled, with compressed and constricted whorls and a club-shaped mouth. *Sculpture*. Longitudinals—the whorls are crossed by narrow little ribs and furrows, of which

there are about 11 on the upper whorls and 19-20 on the penultimate, becoming increasingly feeble as they approach the mouth; they harmonize completely with the course of the dense, clear, and sharp hair-like lines of growth. Spirals—there are narrow, prominent spiral threads, of which two near the bottom of the whorls are somewhat stronger than the others; the furrow which parts them is also a little wider and deeper than the rest; below this is a small but rather sudden constriction of the whorls into the suture; the spirals in crossing the longitudinal ribs are thrown out into blunt white linear points; the spirals on the base and snout are more regular and equal than the others. *Colour* a pale ruddyish yellow, with a fine roughened surface. *Spire* high and conical. *Apex* broken, but apparently very small, sharp, and smooth. *Whorls*, 8 remain; probably the broken embryonic apex consisted of two more; they are convex, with a slight slow contraction above and a small sudden constriction below; the last is small, long, with rounded outlines, and produced into a long, rather lop-sided and slightly twisted snout. *Suture* fine, sharp, impressed. *Mouth* long, club-shaped, being oblong, pointed above and produced in front into a longish canal. *Outer lip* thin, with a slight, white, internal varix, not much arched, patulous in front, where its line is concave, and then straight along the canal. *Inner lip* short and scarcely convex on the body, hollowed at the base of the pillar, which is narrow, straight, and cut off in front, on a long, slightly oblique, and somewhat twisted line; the glazing which edges it is very thin and narrow. H. 1.27. B. 0.5. Penultimate whorl, height 0.2. Mouth, height 0.7, breadth 0.24.

The general aspect of this shell is very much that of a *Fasciolaria*; but the pillar has no plaits. It is not in form unlike the young of *F. rostratus*, Olivi; but the base is much longer, and the snout shorter, and the constriction at the bottom of the whorls is not found in that species; in these respects it has more resemblance to *F. syracusanus*, Lam., in which, however, the whole sculpture is very unlike. It resembles perhaps most of all *F. filusus*, A. Ad., from the Chinese seas, but is still slimmer in its outlines.

I have called this species after my friend Mr. W. H. Dall, of the Smithsonian Museum, Washington, who has give me much good counsel and valuable information.

10. *FUSUS* (*NEPTUNEA*) *FUTILE*, n. sp.

St. 150. Feb. 2, 1874. Lat. 52° 4' S., long. 71° 22' E. Between Kerguelen and Heard Islands. 150 fms. Rock. Bottom temperature 35°·2.

Shell.—Thin, pale, fusiform, long, very bluntly ribbed and with equal spiral threads; the whorls are rounded, the suture rather deep and oblique, the mouth club-shaped, the pillar small and somewhat twisted. *Sculpture*. In the middle of the whorls are low rounded riblets, which extend to neither suture; they are parted by shallow rounded furrows broader than the ribs; the surface is scored with strongish hair-like lines of growth. Spirals—there are clear well-rounded threads, about 9 on the penultimate, and fewer on each preceding whorl; on the last whorl they are not so equal as on the others, being somewhat stronger in the middle of the whorl; they are parted by squarish shallow furrows. *Colour* pale greyish white; but the specimen is bleached. *Spire* high and conical. *Apex* small, smooth, rounded and slightly depressed. *Whorls* 7, of slow increase, rounded, contracted above, slightly so below; the last is small, rounded on the base, and prolonged into a small and somewhat twisted snout. *Suture* oblique, impressed, minutely channelled. *Mouth* club-shaped, being oval above, and produced into a longish canal below. *Outer lip* much broken. *Inner lip*: there is a very narrow thin glaze on the body and pillar, of which the point is bent upwards and twisted. H. 0·74. B. 0·3. Penultimate whorl, height 0·15. Mouth, height 0·36, breadth 0·17.

This species has some resemblance to the young of *F. (N.) lachesis*, Mörch, but has the apex much smaller, is in form more conical, has the suture more oblique, possesses longitudinal ribs, and has the spirals stronger. Compared with *F. (N.) latericeus*, Möll., the apex is much smaller, the whorls are of much slower increase, are more rounded, and are more contracted above, the suture is deeper and more oblique, the ribs are weaker, the spirals are stronger, and the snout is longer and more twisted than in that species. Compared with *F. (N.) undulata*, Friele (which I only know by the admirable plate, kindly sent me by the author), this *F. futile* is smaller in the apex, less cylindrical and more conical, the whorls are less rounded, and difference in breadth below and above is much greater; the suture, too, is much less impressed and more oblique.

11. *FUSUS (COLUS) RADIALIS*, n. sp.

St. 142. Dec. 18, 1873. Lat. $35^{\circ} 4'$ S., long. $18^{\circ} 37'$ E. Off the Cape of Good Hope. 150 fms. Sand. Bottom temperature 47° F.

Shell.—Thin, fusiform, high, narrow, with rounded whorls bisected by a sharp radiatingly tubercled keel, and parted by a deep open suture; the rounded and contracted base is produced into a long narrow snout. *Sculpture*. Longitudinals—the surface is scored by sharp, high, close-set, unequal, hair-like lines of growth. Spirals—in the middle of each whorl is a sharp expressed keel running out into rays of horizontal blunt tubercles*; above this there are two rounded threads, and below it one, parted by flat furrows three times their breadth; on the last whorl below the keel there are of these threads, on the base three, at the root of the snout one, and on the snout about ten. The whole surface is further scratched with fine sharp lines. *Colour*: the specimen is dead and bleached. *Spire* scalar, high and conical. *Apex* eroded. *Whorls* 6 to 7, well rounded but for the prominent sharp keel which angulates them; they are very much contracted above and markedly so below; the last is a little tumid, with a round much contracted base, produced into a long, straight, narrow snout. *Suture* a minute line at the bottom of the deep broad hollow in which the superior and inferior whorls meet. *Mouth* irregularly circular, and produced into a long, straight, narrow canal. *Outer lip* thin. *Inner lip* shortly concave above, and then very straight. H. 1.47. B. 0.62. Penultimate whorl, height 0.2. Mouth, height 0.87, breadth 0.3.

This species, the only specimen of which is unfortunately in very bad condition, slightly resembles *F. spiralis*, A. Ad., but is broader, the suture is deeper, the upper part of the whorls is much more sculptured, and the keel is much sharper and more expressed.

12. *FUSUS (COLUS) SARISSOPHORUS* †, n. sp.

St. 122. Sept. 10, 1873. Lat. $9^{\circ} 5'$ S., long. $34^{\circ} 50'$ W. Off Pernambuco. 350 fms. Mud.

Shell.—Thin, porcellaneous, white, acutely, substellately carinated, with a short, conical, subscalar spire, mamillate apex, deep suture, contracted base, and long, sharp, and fine snout. *Sculp-*

* Hence the name.

† So called from the long pike-like snout which it bears.

ture. Longitudinals—fine hair-like lines of growth closely cover the surface. Spirals—near the bottom of each whorl there is a very sharply expressed but not narrow keel, which is closely beset on the edge with rounded compressed little tubercles; the whole surface of the whorls is scored with fine rounded threads and broader furrows, which are more delicate above than below the keel; these become obsolete toward the point of the snout. *Colour* porcellaneous white. *Spire* short and conical. *Apex* mamillate, but small; it consists of nearly two glossy, keelless, cylindrical whorls, of which the extreme tip is flattened down on one side. *Whorls* 7, sharply angulate and biconical, being contracted above and below. *Suture* deep and sharp. *Mouth* clavate, being oval above and produced below into a very long and minute canal. *Outer lip* sharp, rounded, pinched in at the origin of the canal, down the side of which the line runs straight, and parallel to the pillar. *Inner lip* slightly hollowed above and very straight in front; it is defined by a very thin and narrow glaze. H. 0·77. B. 0·28. Penultimate whorl, height 0·08. Mouth, height 0·55, breadth 0·11.

This very beautiful little shell is probably not full-grown, but possesses very marked features in the short conical spire, sharp stellate keel, and enormously long snout. The only form which seems to approach it is the *Fusus spiralis*, Ad., which has a curious geminately carinated and flattened form of whorls and a long canal; but the keel is median, the suture wide and deep, and the apex is broad and blunt, while the spire is much less broadly conical.

13. *FUSUS (COLUS) PAGODOIDES* *, n. sp.

St. 164 B. June 13, 1874. Lat. 34° 13' S., long. 151° 38' E. Off Sydney. 410 fms. Grey ooze.

Shell.—Rather thin, chalky to porcellaneous, pale, oval, with a high scalar spire made up of small sharp-flanged whorls, with a mamillate apex and a very long fine snout, down which from the round mouth runs a thread-like cleft. *Sculpture.* The surface is scored with extremely sinuous fine lines of growth formed by the subimbricated edges of scarcely raised lamellæ. Spirals—in the middle of each whorl is a sharp keel, which runs out into an excessively sharp, prominent, compressed, and up-turned flange; though so sharp and compressed, this flange is really double, and

* So called from its likeness to *F. pagoda*, Less.

consists of a multitude of very minute hollow arches, imbricated on one another. On the base of the body-whorl, coincident with the upper corner of the mouth, is a small cord-like keel closely beset with minute arched points. The upper third to half of the snout is obliquely scored with remote raised threads rising into high, sharp, arched scales. There are a few faint microscopic spiral scratches. *Colour* a dead, faintly yellowish, semiporcellaneous white. *Spire* high and conical. *Apex* smooth, small, but very blunt and mamillate, consisting of little more than one embryonic whorl, which is turned up on end, bent right over and spread out on the next, in which the characteristic keel appears almost immediately. *Whorls* 7, small, of very slow increase, excessively keeled, with a hollowed shoulder above, rounded and constricted below; the last is contracted very much to the middle of the base, which is produced into a very long and very narrow, slightly flexuous, conical snout. *Suture* small but distinct, and sharp, in the bottom of the wide constriction between the keels. *Mouth* angularly rounded, running out into a small canal at the keel, and prolonged below into the long, narrow, sinuous slit of the front canal. *Outer lip* thin, roundly arched, sharply cut by the carinal canal, and again on the base by a little canal on the basal thread; it is very much pinched-in in front, and then runs down straight along the edge of the slit of the front canal. *Inner lip* rounded at the very top; it then runs straight to the point of the pillar; somewhat thickened above; it joins the outer lip, and stands out prominently from the body, with a deep cleft behind it; it is continued down the whole pillar, standing out as a sharp thin lamina. *Operculum* large for the aperture, thin, yellow, roundedly triangular, with a terminal apex, and scored across with many fine curved lines of increase, altogether much like that of many of the Pleurotomidæ. H. 2·18. B. 0·9. Penultimate whorl, height 0·19. Mouth, height 1·72 (aperture 0·34, canal 1·38), breadth 0·3.

I have described this as a distinct species in obedience to the advice of all competent judges who have been consulted; but my own belief remains unaltered that it is a mere variety of *F. pagoda*, Less. Than that, this is a smaller shell, with a shorter spire; its carinal crown is a continuous flange, not a series of hollow flat spikes, the whorls are higher between keel and suture, the base is more contracted and compressed, the prickles on the spiral threads of base and snout are much closer, sharper, and

higher, the canal in front is much narrower; finally, Lesson's species has *two* embryonic whorls, and these stand up much higher than in this.

The Rev. J. E. Tenison Woods, in a very interesting paper (read before the Royal Society of N. S. Wales, July 4, 1877, and of which he obligingly sent me a copy) on the Tertiary deposits of Australia, p. 8, refers to a fossil *Fusus* occurring in the lowest clays of the Australian Tertiary deposits of lower Miocene, or perhaps Eocene, age. Of this *Fusus* he says that "it is so like the beautiful and delicately spined *F. pagodus* of the Philippines, that it has I believe been named *F. pagodoïdes* by Prof. M'Coy." I have not been able to ascertain that this species has ever been published, and having already, before Mr. Woods's paper reached me, selected this name for the 'Challenger' species, I have thought it better to retain it, the more so that, should the Australian fossil prove to be the same as the species living in deep water off Sydney, the substitution of another name would be a pity and would tend to create confusion.

Since writing the above, and just as this paper is leaving my hands, I have received from Prof. v. Martens with his accustomed kindness the number of his 'Conchologische Mittheilungen' (vol. II. pts. 1 & 2), issued for December 1881, containing his beautifully illustrated description of *Fusus pagoda*, Lesson (p. 106, pl. xxi. f. 4.), which he attaches to a new subgenus of *Pleurotoma* under the name of *Columbarium*, enriching the group with a new species *P. (C.) spinicincta* (p. 105, pl. xxi. f. 1-3), got by the German war-vessel 'Gazelle' in 76 fathoms, from (apparently) a spot some 500 miles N. by E., on the same east coast of Australia from which the 'Challenger' specimens come. At p. 122, Mr. G. Schacko (pl. xxiv. f. 1, 2) gives details of the radula, on the peculiarities of which the subgenus is mainly based. The opinion of Prof. v. Martens is of course of commanding weight; and if I have not followed him here, it is merely because I see that not *F. pagodoïdes* alone, but many of the forms grouped under *Trophon* will have to share the fate of *F. pagoda*, Less., whatever that may ultimately be.

In the meantime I content myself with calling attention to this increase in the number of those forms which gather round Lesson's remarkable and beautiful species. With this increase in their number, however, there comes no link of connexion between them; for not one of the three species helps to unite the

other two, though the 'Challenger' species stands on the whole nearer to Lesson's than v. Martens's species does to either. *P. (C.) spinicineta*, v. Mart., is distinguished by its high conical spire, its small apex, its more numerous carinal spines, its double basal keel, and the sparseness of the muricated threads on its snout.

TROPHON, *de Montfort.*

- | | | |
|----------------------------------|--|---------------------------------|
| 1. <i>T. acanthodes</i> , n. sp. | | 4. <i>T. aculeatus</i> , n. sp. |
| 2. <i>T. carduelis</i> , n. sp. | | 5. <i>T. septus</i> , n. sp. |
| 3. <i>T. declinans</i> , n. sp. | | 6. <i>T. scolopax</i> , n. sp. |

1. TROPHON ACANTHODES, n. sp. (*ἀκανθώδης*, prickly.)

St. 308. Jan. 5, 1876. Lat. 50° 8' 30" S, long. 74° 41' W.
W. Patagonia. 125 fms. Mud.

Shell.—Strongish, chalkily porcellaneous, yellowish, fusiform, with a high scalar spire, small apex, sharply keeled and radiatingly spiked whorls, a rounded contracted base, and a long, narrow, but strong snout. *Sculpture.* Longitudinals—the surface is scored with close, very irregular lines formed by the slightly raised edges of thin imbricated procumbent lamellæ, between which there are almost microscopic scratches in the lines of growth; there are 8 or 9 feeble oblique riblets on the lower part of the whorls; these die out on the base. Spirals—toward the upper part of each whorl there is an acute angulation with an expressed rounded keel, from which projects a coronal of longish rays or pointed, up-turned, retroverted vaulted spikes, each of which forms the origin of one of the longitudinal riblets; below this keel there are feeble, irregular, rounded threads, which may be recognized on the snout. The whole surface is covered with very fine, close-set rounded threadlets. *Colour* yellowish, with a singularly harsh surface. *Spire* high, scalar. *Apex* mamillate, but small, consisting of nearly three smooth, cylindrical, embryonic whorls, of which the extreme tip is slightly immersed. *Whorls* 7 to 8, flat above, sharply angulated, keeled and coronated, conically contracted to the lower suture; they are all small, but the last, which is a little tumid, with a rounded base, very much contracted and produced into a long, straight, spike-like snout. *Suture* sharp and deep, in the bottom of the broad depression between the keels. *Mouth* club-shaped, being rather small and oval above, and contracted below into the long, narrow, but patulous canal. *Outer lip* roundly arched, angulated at the keel, where

the vaulted spikes present a canal; it is patulous below and down the whole anterior canal. *Inner lip* rounded above, where it expands on the body, joining the outer lip without any angulation; at the top of the canal it projects in a slight blunt tooth; from this point it becomes much narrower, and only the excessively narrow edge of the glaze can be recognized, almost hiding behind the long straight pillar. H. 1.5. B. (exclusive of the spines) 0.64. Penultimate whorl, height 0.22. Mouth, height 1, breadth 0.32.

This species resembles *T. vaginatus*, Jan, but is much more tumid on the base, is more constricted at the anterior canal, has a straighter snout, a less contracted suture, and a lower spire.

2. *TROPHON CARDUELIS* *, n. sp.

St. 164 B. June 13, 1873. Lat. 34° 13' S., long. 151° 38' E. Off Sydney. 410 fms. Grey ooze.

Shell.—Thin, porcellaneous white, fusiform, with a high scalar spire, very small apex, long, small snout, angulated whorls, scored by thin, sharp, procumbent lamellæ rising on the keel into high vaulted spikes. *Sculpture*. Longitudinals—there are on each whorl 9 or 10 thin, sharp, vaulted, and procumbent lamellæ, the old lip-edges; they are pretty prominent, cross the whole whorls, are obliquely continuous from whorl to whorl, rise on the upper part of the whorls into hollow, vaulted, upturned, and reverted spikes, and are traceable to the point of the snout; between these lamellæ are slight lines of growth. Spirals—above the middle of each whorl there is an angulation, the effect of which is greatly increased by the coronal of spikes which project at this point; one or two very depressed rounded threads, parted by minute linear furrows, are also found on this angulation; similar but feebler and very irregular threads and furrows cover the rest of the surface. *Colour* porcellaneous white, with a smooth but not polished surface. *Spire* high, scalar. *Apex* small, consisting of two smooth rounded, globose, embryonic whorls, the extreme tip of which is very small and is slightly turned over and immersed. *Whorls* about 10, flatly sloping above, angulated and coronated, conically contracted to the lower suture; they are all small but the last, which is slightly tumid, with a rounded and shortly produced base pro-

* I have failed to approach the idea of "thistly" nearer than by this, the name of the Thistle-Finch, which really ought to have had the same latitude as its Greek equivalent *akarthis*. The prickles on this species of *Trophon* recall strongly those of the involucre of some thistles.

longed into a projecting, narrow, slightly reverted snout, which is a little bent at the point. *Suture* small and sharp, interrupted by the lamellæ, but very strongly marked by the deep constriction of the whorls. *Mouth* club-shaped, being oval above and produced into the long narrow canal. *Outer lip* sharp and thin, leaves the body at a right angle, advances straight to the keel, where a patulous canal is formed in the spike; below this the lip is extremely patulous, and well arched to the origin of the canal, where the lip is sharply pinched-in, and from this point runs direct, but a little obliquely, to the point of the snout, where it is squarely cut off. *Inner lip* is a little concave above, straight on the pillar, slightly oblique down the canal; it is defined on the body and pillar by a thin, narrow, patulous pad; this pad crosses the pillar, and runs into the canal, along the side of which it shows only a thin sharp edge, with a small chink behind it. *Operculum* thin, yellow, ovate, acute, with a terminal apex, and corrugations and striæ in the curves of growth. H. 1·27. B. (spines included) 0·8, (excluded) 0·5. Penultimate whorl, height 0·19. Mouth, height 0·8, breadth 0·31.

This is a species beautiful in form and in texture. With some superficial resemblance, it differs from *T. acanthodes*, Wats., in its continuous longitudinal lamellæ, the thinness of its shell, the delicacy of its surface-texture, and the form of the base. In the latter respects it recalls *T. vaginatus*, Jan; but, than that species, it is less carinated, has a more contracted shorter base, a finer snout, and the spines are much more distinctly connected with the continuous lamellæ. *T. coronatus*, H. & A. Ad., a New-Zealand form, and which extremely resembles *T. Goodridgii*, For., has a much longer canal, a more tumid body, more numerous varices, with shorter spines not rising, as here, in a coronal round the spire. *T. laciniatus*, Martyn, from Vancouver's Island, presents a variety slightly resembling the 'Challenger' species; but the snout is much shorter, the base more produced; the spines, too, are very much shorter, and, rising near the suture, project upwards parallel to the spire.

3. *TROPHON DECLINANS*, n. sp.

St. 144 A. Dec. 26, 1873. Lat. 46° 48' S., long. 37° 39' 30" E. Off Marion Island. 100 fms. (?) Grey sand.

St. 150. Feb. 2, 1873. Lat. 52° 4' S., long. 71° 22' E. Between Kerguelen and Heard Islands. 150 fms. Rock. Bottom temperature 35°·2.

Shell.—Thin, chalky white with a tinge of buff, fusiform, with a high subscalar spire, small mamillary apex, long small snout, rounded whorls scored by thin procumbent lamellæ. *Sculpture*. Longitudinals—there are on the later whorls from 15 to 20 procumbent lamellæ, between these are slight lines of growth. Spirals—there are a few quite irregular and obsolete rounded threads. *Colour* chalky white with a tinge of buff. *Spire* high, subscalar. *Apex* small, consisting of barely two smooth, globose, embryonic whorls, of which the extreme tip is slightly turned down on one side and immersed. *Whorls* 7, slightly flattened above, convexly cylindrical below, with a very slight contraction above the suture; the last is a little tumid, with a produced conical base running out into a long, small, twisted, and upturned snout. *Suture* slightly impressed, oblique. *Mouth* oval, bluntly pointed above, drawn out into the long, narrow, and oblique canal in front. *Outer lip* thin, arched, slightly reverted and patulous; very obliquely cut off and emarginated at the point of the canal. *Inner lip* very concave above, convex at the entrance to the canal, from which it runs with a twist and very obliquely to the left; the labial glaze is thin and somewhat indefinite. H. 0·8. B. 0·32. Penultimate whorl, height 0·17. Mouth, height 0·43, breadth 0·2.

I have described this as a new species with very great reluctance. My own opinion is that it is a large thin variety of *T. truncatus*, Ström; and that opinion is shared by Mr. E. A. Smith. Dr. Gwyn Jeffreys, however, and Prof. G. O. Sars decidedly hold it as distinct; and their extensive acquaintance with the large northern variety of *T. truncatus* makes their judgment of great weight. Along with the specimen of this species which I submitted to Prof. Sars I forwarded another shell, sadly broken, which I consider different and new, and have named *T. auditus*, from St. 150, and which I sent thinking it might be his *T. clavatus*. Prof. Sars's own letter will best convey his opinion regarding both of these forms:—"I have examined your shells very closely; they show a very perplexing similarity in form and sculpture to northern Trophons. . . . The one specimen is certainly very nearly related to *T. truncatus*, Ström; but still I find, on comparing it with Norwegian specimens of the species, some differences. Thus the shell, though larger, is less solid, and the longitudinal ribs are also somewhat different both in number and in form; in all my specimens of *T. truncatus* they are distinctly lamellar and

reflexed; but in your specimen they have more the appearance of simple sharp folds or keels*. The other specimen somewhat resembles my *T. clavatus*—thus far at least, that the ribs are produced in similar tooth-like protuberances; but the ribs are more numerous, the spire somewhat more elongated, and the form of the “*cauda*” cannot be ascertained. After all, I must consider your specimens distinct from Northern forms. But, on the other hand, I should not be unwilling to regard both specimens as belonging to one species, and thus mere varieties analogous to the forms *T. clathratus* and *Gunneri*. Your specimens from Kerguelen are in any case very interesting as representing, even if not in my opinion an identical, yet at least a very similar and strictly representative form of *Trophon* belonging to the Southern hemisphere.”

4. *TROPHON ACULEATUS*, n. sp.

St. 122. Sept. 10, 1873. Lat. 9° 5' S., long. 34° 50' W. Off Pernambuco. 350 fms. Mud.

Shell.—Small, thin, porcellaneous white, fusiform, with a high scalar spire, a blunt, mamillate, one-sided apex, a short conical base, a long small snout, and angulated whorls crossed by continuous thin, vaulted lamellæ, projecting on the angulation of the whorls into small sharp points. *Sculpture*. Longitudinals—there are on each whorl about 12 vaulted lamellæ, which run continuously from below the apex to the snout; between these are a few fine lines of growth. Spirals—an angulation, strongly marked by the projecting points of the longitudinal lamellæ, is in the middle of the whorls. *Colour* porcellaneous white. *Spire* high, scalar. *Apex* small, blunt, mamillate, with the extreme tip very much turned down on one side; the $1\frac{3}{4}$ embryonic whorls are tumid, rounded, and smooth. *Whorls* 6 to 7, with a straight declining shoulder, angulated in the middle and conically contracted below; the conical base is produced into a narrow longish snout. *Suture* deep and angular. *Mouth* club-shaped, being angulated above, and produced into the long narrow canal below. *Outer lip* sharp, thin, and patulous on the edge; it leaves the body at a right angle, and is right-angled at the keel. *Inner lip* is slightly concave above, straight on the very short pillar, and oblique down the edge of the long canal; a thin narrow glaze lies

* I do not admit the distinction which Prof. Sars here makes. I consider the longitudinal ribs in *T. declinans* to be quite as certainly procumbent lamellæ; only this feature is somewhat obscured by their being much chipped.—R. B. W.

on the edge of the body and pillar, at the point of which it crosses and lies hidden behind the sharp canal-edge. H. 0.45. B. 0.2. Penultimate whorl, height 0.08. Mouth, height 0.28, breadth 0.09.

This pretty little species perhaps resembles *T. barvicensis*, Johnston, more than any other, but, besides being more attenuated, is markedly differentiated by the median angulation of the whorls and the absence of the spiral threads of that species.

5. *TROPHON SEPTUS*, n. sp.

St. 149 D. Jan. 20, 1874. Lat. 49° 28' S., long. 70° 13' E. Royal Sound, Kerguelen. 28 fms. Mud.

Shell.—Thin, porcellaneous white, club-shaped, with a low scalar spire, blunt apex, high-shouldered sharply expressly and spinously keeled whorls, a tumid body, and a long thin flexuous snout. *Sculpture*. Longitudinals—the whorls are scored by feeble lamellæ and by coarsish lines of growth. Spirals—at the top of each whorl, but separated from the suture by a broad tabulation, is a right-angled keel, from which, nearly parallel to the axis of the shell, project a series of hollow, vaulted, compressed triangular spines; besides this coronal there is no other spiral sculpture except some irregular lines on the base. *Colour* porcellaneous white, with some chalkiness on the surface. *Apex* rather small, mamillate, and a little turned down on one side. *Whorls* 5 or 6, flatly tabulated above, with a rectangular keel, below which they are cylindrical; the last is a little tumid on the base, which contracts rapidly and is drawn out into a long, thin, flexuous snout. *Suture* almost rectangular. *Mouth* round, with a blunt angle at the top and a siphon at the keel, and suddenly prolonged into the narrow canal. *Outer lip* sharp, thin, direct, well arched, not prominent. *Inner lip* is concave above, slightly oblique on the very short pillar, and much more so on the long, bent, and slightly reverted snout; a thin narrow glaze defines it to the point of the pillar, where it crosses to the canal, leaving a minute chink on its outer edge above. *Operculum* thin, yellow, oval, with a blunt apex, where the nucleus is terminal. H. 0.91. B. 0.43. Penultimate whorl, height 0.1. Mouth, height 0.67, breadth 0.16.

The upturned coronal of hollow spines and the more contracted base differentiate this from *T. Goodridgii*, Forbes. It has some faint resemblance to the *Pleurotoma cedo-nulli*, Reeve.

6. TROPHON SCOLOPAX, n. sp.

St. 150. Feb. 2, 1874. Lat. $52^{\circ} 4' S.$, long. $71^{\circ} 22' E.$ Between Kerguelen and Heard Islands. 150 fms. Rock. Bottom temperature $35^{\circ} 2.$

Shell.—Thin, chalkily porcellaneous white, club-shaped, with a low, scalar, small-pointed spire, high-shouldered, right-angled whorls on which are some small prickles, a tumid body, and a long, thin, straight snout. *Sculpture*. Longitudinals—the whorls are crossed by feeble, procumbent, almost appressed lamellæ, between which are a few rounded lines of growth. Spirals—near the top of each whorl, but separated from the suture by a broad, rounded, but hardly declining shoulder, is a rectangular keel; below this, and widely apart, there are on the body-whorl three feeble rounded threads; on these, as on the keel, the longitudinal lamellæ rise into small, blunt, vaulted scales. The whole surface of the shell is covered with submicroscopic scratches. *Colour* porcellaneous under a thin chalky surface. *Apex* small, but too much eroded for description. *Whorls* 6 to 7 (?), roundly tabulated above, with a subrectangular keel, below which they are cylindrical; the last is a little tumid, rounded and rapidly contracted on the base, which is produced into a long, thin, straight snout. *Suture* almost rectangular. *Mouth* almost round above, and entirely without angles, funnel-shaped below, where it is drawn out into the long narrow canal. *Outer lip* sharp, thin, well arched, direct till near the canal, where it is very patulous. *Inner lip* concave above, and then quite straight to the point of the shell; a very thin and narrow glaze covers the body to the beginning of the canal. *Operculum* small, thin, yellow, oval, with a terminal but slightly in-turned nucleus. H. 0.95. B. 0.42. Penultimate whorl, height 0.12. Mouth, height 0.7, breadth 0.2.

I have named this species from some likeness it has to a Woodcock's head. It resembles *T. Goodridgii*, Forbes, but has the body smaller and squarer, the base more contracted, the canal much longer and finer, and the whorls are tabulated below the suture. It is larger than *T. septus*, the snout is straighter, and the whole ornamentation is different.
